

DISCONNECTING DEVICE FOR COMMUNICATIONS CONNECTIONS

[0001] If the user of a PC wants to access the intranet, he needs a modem in his PC. The modem allows the connection of the PC to a telephone or ISDN line, which constitutes the communications connection with a remote communications computer.

[0002] Definite connections should always exist or should be activated as needed. So that electrical current is not used unnecessarily in spite of these requirements, a sleep mode is provided for modern PCs, into which the PC is practically completely shut off, except for a few groups of devices. However, there is the option of turning the PC on again from a distance by means of a wake-up signal.

[0003] This output characteristic is always present in the PC and in the end results in that the PC, which from the view of the user is turned off, can actually always be turned on by remote control, unless the user operates a mechanical network switch.

[0004] Moreover, modern PCs as a rule no longer have the classic switches connected with the electrical current supply for disconnecting the device completely from the current supply. Instead, the power units of the PCs are continuously connected with the current supply. They are activated and deactivated by means of semiconductor switches. The energy required for this is also taken from the current supply. Because of this it becomes possible, as mentioned above, to switch the PC on or off by remote control, in that the electronic switch for the operational status of the power unit is controlled by means of the modem, for example. The modem itself receives its power via a different path, so that it is continuously switched on independently of the PC.

[0005] It is also possible to attack the PC via the telecommunications lines, and this preferably in those cases where it can be assumed that the user cannot monitor his device.

[0006] On the basis of this it is the object of the invention to create a switching arrangement which is capable of interrupting the communications connection to the computer, so that remote-controlled switching-on is no longer possible.

[0007] In accordance with the invention, this object is attained by means of the switching arrangement having the characteristics of claim 1.

[0008] The switching arrangement in accordance with the invention has an at least single-pole PC connector as well as an at least single-pole remote connector, so that it can be switched into a data link between the PC and a remotely located data source with the aid of these two connectors. A switching device is located in the switching arrangement and has two switching states. In the first switching state the data connection between the two connectors possible, while the data connection is interrupted in the second state.

[0009] A control connector of the switching device is used to switch the switching device back and forth between the two switching states. The control connector is embodied

for being connected with a supply voltage of the PC, which is actually shut off in the sleep mode of the PC and only appears after complete switch-on.

[0010] If the user employs such a switching arrangement and turns off his computer by means of the control knob for the power unit, the control voltage for the disconnecting device disappears. The latter then makes a transition into the switching state in which the data connection is interrupted. Wake-up signals for the PC coming from the outside can no longer reach the PC and switch it on. If the user himself switches the PC on, an appropriate supply voltage is available, which is capable of switching the disconnecting device over into the first switching state. The PC is connected with the data line from this time on.

[0011] The switching arrangement in accordance with the invention can be implemented in the PC itself or can be contained in a separate housing for being connected with the PC by means of a plug connector.

[0012] The at least one-pole PC connector usefully consists of a telecommunications connector of the same standard as also exists in the PC. This can be an analog connector, as well as an ISDN connector.

[0013] The same correspondingly applies for the outgoing connector, the remote connector, which is also usefully provided with a plug connector such as originally provided in the PC.

[0014] So that the data transmission takes place without problems in both direction, and no ground connection problems can occur, the electrical switching arrangement usefully consists of at least one relay, which is appropriately designed with many poles.

[0015] In order not to require additional plug connectors on the PC, the control connector of the switching arrangement in accordance with the invention is usefully equipped with two plug connectors, so that these two plug connectors can be switched into a connecting line with another peripheral device. Examples of such peripheral devices are the mouse, the keyboard, the printer and the like. A USB connector is also possible. It is sufficient if the respective connector additionally provides a supply voltage to the peripheral device and this supply voltage is also switched off in the sleep mode of the PC.

[0016] Things become particularly simple if the housing has appropriate plug sockets, for example RJ-45 plug sockets, at both ends, and the plug connector is equipped as a double plug connector with a plug or socket for looping through a connection of a peripheral device.

[0017] Further developments of the invention are otherwise the subject of dependent claims. In this connection those combinations of characteristics are to be considered claimed to which no specific exemplary embodiment is directed.

[0018] An exemplary embodiment of the subject of the invention is represented in the drawings. Shown are in:

[0019] Fig. 1, a perspective representation of the device in accordance with the invention for disconnecting a communication line from a PC,

[0020] Fig. 2, the basic use of the device in accordance with the invention in a basic wiring diagram, and

[0021] Fig. 3, the electrical structure of the switching arrangement in a simplified basic wiring diagram.

[0022] A device 1 in accordance with the invention for disconnecting a data connection is presented in Fig. 1. An approximately cube-shaped housing 2 with two oppositely located ends 3 and 4 is a part of the device 1. A plug connector 5 is housed in each one of the two ends 3 and 4. Because of the perspective representation, only the plug connector 5a in the front end 3 can be seen. The plug connector in the front end 4 is embodied in the same way. The two plug connectors are RJ-45 plug sockets in an 8-pole design. Such plug sockets are also known as Western plug sockets.

[0023] A control cable 7 extends from a substantially flat top 6 and leads to a further plug connector arrangement 8. On the side facing the viewer, the plug connector arrangement 8 is provided with a plug 9 which is complementary to the plug sockets provided on a PC for connecting a mouse, keyboard or the like. The housing of the plug connector arrangement 8 has a plug socket on the opposite side, which is complementary to the plug 9 shown.

[0024] In accordance with Fig. 2, the device 1 in accordance with the invention is connected with a PC 11. The PC 11 has a plug socket 12, into which the plug 9 of the plug arrangement 8 is inserted. A plug 14 of a cable 15, which connects the plug 14 with a computer mouse 16, is inserted into the plug socket 13 contained on the side of the plug arrangement 8 located opposite the plug 9.

[0025] The PC 11 has a further RJ-45 plug socket 17, into which an RJ-45 plug 18 has been inserted. One of the two plug connectors 5 of the device 1 is connected with the PC 11 via a connecting cable 19 with a further RJ-45 plug 21 connected to the cable. A further RJ-45 plug 22 has been inserted into the other plug connector 5 and is connected to a line 23 leading away from the PC 11. The line 23 terminates, for example, at an S₀ bus of an ISDN line leading to a switching center.

[0026] A relay 24 with a total of 8 poles is located in the housing 2. Each switch set 25 of the relay 24 connects one pole 26 of the one RJ-45 plug connector 5a with the corresponding pole 26b of the other RJ-45 plug connector 5b.

[0027] The circuit diagram in Fig. 3 is schematized. Only two switch sets 25 are shown, while the remaining connecting lines between the two connectors 5a, 5b are only partially shown.

[0028] A relay winding 27 is part of the relay 24 and is connected via the control cable 7 and two lines 28 and 29 contained therein with two lines 31 and 32 and connects two poles of the plug

9 with the corresponding poles of the plug socket 13. These are those poles through which the computer mouse 16 or a connected keyboard receives supply voltage from the PC 11.

[0029] The functioning of the arrangement in accordance with the invention is as follows:

[0030] With the PC 11 switched off, the PC 11 does not provide a supply voltage to the computer mouse 16. As a consequence, the two connecting lines 31 and 32 are without voltage, so that the relay winding 27 is also not provided with current. The relay 24 is in its state of rest. Since the switch sets 25 are working contacts, they are in their open position of rest. In this position there is no galvanic connection between any one of the poles 26a of the connector 5a and one of the poles 26b of the connector 5b. The data connection between the communications line 23 and the appropriate plug 17 at the PC 11 is galvanically interrupted. Signals arriving via the communications line 23 cannot be forwarded to the PC 11. It is not possible to remotely switch the PC 11 out of its sleep mode into the fully switched-on state.

[0031] As soon as the user switches the PC 11 on, the latter provides a supply voltage to the computer mouse 16. This voltage occurs in the lines 31 and 32, with which the relay winding 27 lies parallel. As a result of this the relay 24 pulls and brings the contact sets 25 into the switched-on position. Now each one of the poles 26a is connected with a corresponding pole 26b of the other plug connector 5b.

[0032] Because the computer mouse 16 is also connected to plug socket 13, it is supplied with current in the same way as is the case when the plug 14 is directly seated in the plug socket 12. Furthermore, all lines which otherwise connect the computer mouse 16 with the PC 11 are looped in an unchanged manner through the plug arrangement 8. Appropriate connecting lines 33 are provided.

[0033] The use of a relay sees to it that no galvanic connection at all is made between the plug socket 12 for the computer mouse 16 and the plug 17, to which the communications line 23 is normally directly connected. Because of the use of the arrangement in accordance with the invention nothing changes in the d.c. voltage relations in comparison with the direct connection of the computer mouse 15, or the communications line 23, with the PC 11.

[0034] The use of the relay 24 furthermore has the advantage that the electrical connection between the two RJ-45 connectors 5a and 5b is independent of the direction or potential. The user is not forced to assure that the device in accordance with the invention is only switched in a defined manner between the plug 17 and the communication line 23. The ohmic connection between the two connectors 5a and 5b allows the flow of current in both directions.

[0035] For one skilled in the art it also follows from the explained exemplary embodiment that it is possible to use semiconductor switches in place of the relay 24, or Reed contacts the same as optical couplers. Depending on the requirements, the optical couplers can be switched bidirectionally or unidirectionally, and it is furthermore possible to

control the data connection between the two sockets free of potential by means of the supply voltage on the lines 31 and 32. Such modifications are also considered to be included. Since one skilled in the art knows in what manner he needs to modify the circuit appropriately, it is not necessary to cite a further exemplary embodiment for explanation.

[0036] A switching arrangement is connected between a PC and a communications line. The switching arrangement is controlled by a supply voltage accessible from the outside of the PC. With the PC switched off, this supply voltage disappears and the device in the communications line switches into a blocking mode. In this way it is possible to disconnect the PC completely from the communications line without acting on the PC, even if the communications card or the modem wants to maintain a constant connection with the outside world.